

AMENDMENTS TO THE CLAIMS:

This listing of claims replaces all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended) An apparatus comprising:
a resonator operating for use with bulk acoustic waves, the resonator comprising
having a layer sequence, containing:

[[-]] a lower layer region[[-]] ~~which comprises~~ comprising a first
electrode;[[-]]

[[-]] an upper layer region[[-]]~~which comprises~~ comprising a second
electrode; and [[-]]

[[-]] a piezoelectric layer[[-]]~~which is arranged~~ between the first electrode
and the second electrode; and [[-]]

[[-]]~~wherein~~ a capacitor is ~~connected~~ in parallel ~~or in series~~ with said the resonator
or in series with the resonator.
2. (Currently Amended) ~~Resonator as recited in~~ The apparatus of claim 1, which is
arranged on further comprising a carrier substrate, the resonator and the capacitor being on
the carrier substrate.

3. (Currently Amended) ~~Resonator as recited in~~ The apparatus of claim 1 or 2, in .
~~which~~ wherein each of the upper layer region and the lower layer region each consists of
~~one layer or comprises~~ a plurality of layers.

4. (Currently Amended) ~~Resonator as recited in at least one of claims 1 to 3~~ The
apparatus of claim 3, wherein a plurality of layers in the upper layer region comprises
layers that include different materials, and a plurality of layers in the lower layer region
comprises layers that include different materials ~~in which the first and/or the second~~
~~electrode consists of a plurality of layers, which are made of at least two different~~
~~materials.~~

5. (Currently Amended) ~~Resonator as recited in at least one of claims 1 to 4~~ The
apparatus of claim 1, wherein at least one of the upper layer region and the lower layer
region comprises ~~in which an acoustic mirror is realized in the upper and/or in the lower~~
~~layer region, said~~ the acoustic mirror comprising at least two alternating layers having
different acoustic impedances ~~impedance.~~

6. (Currently Amended) ~~Resonator as recited in~~ The apparatus of claim 5, in
~~which~~ wherein at least one of the layers layer of the acoustic mirror comprises an electrode
layer ~~is one of said electrodes.~~

7. (Currently Amended) ~~Resonator as recited in at least one of claims 1 to 6~~ The apparatus of claim 2, which is arranged over an air gap provided in wherein the carrier substrate includes an air gap; and
wherein the resonator is over the air gap.

8. (Currently Amended) A filter comprising resonators for use with bulk acoustic waves,

each of the resonators comprising:

a lower layer region comprising a first electrode;

an upper layer region comprising a second electrode; and

a piezoelectric layer between the first electrode and the second electrode;

wherein the resonators are in at least one of having a ladder-type arrangement, a lattice-type arrangement, and ~~or a stacked crystal filter arrangement, which contains at least one resonator as recited in at least one of claims 1 to 7 in a serial branch and/or a parallel branch; and~~

a capacitor in parallel with at least one or the resonators or in series with at least one of the resonators.

9. (Currently Amended) The filter as recited in of claim 8, in which a wherein the capacitor is connected in parallel or in series, respectively, only to the respective to only one of the resonators, the capacitor being connected in a circuit path that is in series with, or in parallel with, the one of the resonators in the serial branches or only to the respective

~~resonators in the parallel branches, which reduces the coupling of the corresponding resonators.~~

10. (Currently Amended) A duplexer, containing at least one filter as recited in comprising a filter according to claim 8 or 9.

11. (Currently Amended) An electrical circuit comprising containing:
a stack of resonators comprising: resonator stack that comprises
at least two first resonators arranged on top of one another and operating
that operate with bulk acoustic waves, the first resonators comprising an upper
resonator and a lower resonator, each of the upper resonator and the lower
resonator comprising upper and lower electrodes; [[,]] and
at least one of an additional resonator or a second resonator stack the operates with
bulk acoustic waves, the second resonator comprising electrodes;[[,]]
wherein each of said resonators operating with bulk acoustic waves contains the
first resonators and the second resonator each comprise: a lower electrode, an upper
electrode, and a piezoelectric layer arranged between the upper and lower electrodes; and
two,
wherein the an upper electrode of the lower resonator operating with bulk acoustic
waves and the a lower electrode of the upper resonator operating with bulk acoustic waves,
which are arranged on top of one another in the resonator stack, is are electrically

connected to an electrode of the second resonator ~~with one of the electrodes of at least one additional resonator or resonator stack.~~

12. (Currently Amended) The electrical circuit as recited in of claim 11, ~~in which the second~~ wherein an electrode of the ~~at least one additional~~ second resonator is connected to ground.

13. (Currently Amended) The electrical circuit as recited in of claim 11 ~~or 12, in which~~ wherein the stack of resonators further comprises:

a coupling layer ~~is provided~~ between the upper electrode of the lower resonator ~~operating with bulk acoustic waves~~ and the lower electrode of the upper resonator ~~operating with bulk acoustic waves, which are arranged in the resonator stack.~~

14. (Currently Amended) The electrical circuit of claim 11 ~~as recited in one of claims 11 to 13, in which the at least one additional resonator is a resonator operating with bulk acoustic waves, a resonator operating with acoustic surface waves, wherein the~~ second resonator comprises an LC resonator ~~or a resonator stack that comprises at least two resonators arranged on top of one another operating with bulk acoustic waves.~~

15. (New) The electrical circuit of claim 11, further comprising a second stack of resonators, the second stack of resonators containing the second resonator.

16. (New) The filter of claim 8, further comprising a carrier substrate, at least one of the resonators and the capacitor being on the carrier substrate.

17. (New) The filter of claim 8, wherein, for each of the resonators, an upper layer region and a lower layer region comprises a plurality of layers.

18. (New) The filter of claim 17, wherein a plurality of layers in each upper layer region comprises layers that include different materials, and a plurality of layers in each lower layer region comprises layers that include different materials.

19. (New) The filter of claim 8, wherein each upper layer region and each lower layer region comprises an acoustic mirror, each acoustic mirror comprising at least two alternating layers having different acoustic impedances.

20. (New) The filter of claim 19, wherein at least one layer of each acoustic mirror comprises an electrode layer.

21. (New) The filter of claim 16, wherein the carrier substrate includes an air gap;
and
wherein at least one of the resonators is over the air gap.

22. (New) A duplexer comprising a filter according to claim 9.